Impact of Teaching Simulations on Resilience, Empathy and Culturally Responsive Teaching Self-Efficacy in Career Technology Teacher Preparation Students

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Article Info	Abstract
	Pre-post paired data gathered from 15 students enrolled in a career and technical education high school course focusing on teacher education were analyzed to measure the impact due to experiences in a simulated teaching environment. The main research focus was to explore the relationship between variables considered to be important for the success of teachers including resilience, empathy and culturally responsive teaching self-efficacy. Results from this pilot study indicated that providing teaching simulation experiences for participants interested in a teaching career can significantly ($p < .05$) increase resilience and also have a positive impact on culturally responsive teaching self-efficacy as well as empathy. An additional finding from this study is the emergence of a much stronger positive relationship between Resilience and the three empathy measures at posttest following the simulated teaching intervention.

Introduction

Teachers can influence the future of children's academic and emotional well-being, thereby shaping lifelong outcomes. Having enough qualified teachers is essential for a strong education system, and teacher shortages negatively impact students' learning (Gerritsen et al., 2016; Sorenson & Ladd, 2018). In the US, as well as Europe, the teacher shortage has become a national concern (European Commission/EACEA/Eurydice, 2018). The shortage was made even more dismal by the COVID-19 pandemic (Lopez, 2021; Nguyen et al., 2022) causing school systems to staff classrooms with unqualified people (Poff, 2022; Sandoval, 2022). During the 2018–2019 school year, the national teacher shortage exceeded 120,000 vacancies (Wiggan et al., 2021). It is estimated that within the next decade approximately 1.5 million new teachers will be needed (US Dept of Ed., 2015; Wiggan et al., 2021).

The teacher shortages have been attributed to both recruitment and retention issues. Enrollment in teacher preparation programs has been declining for many years (Will, 2022), as well as teachers leaving the field for early retirement. Even when districts find qualified teachers, they often leave the field within a few years after beginning teaching (Gorard et al., 2023). It has been estimated that between 40 and 50% of teachers leave the

classroom within their first five years in the profession (Ingersoll, 2014; Lindqvist et al., 2014). Some of the issues contributing to the teacher shortage are related to teacher pay, stress, discouragement and the lack of proper training and mentorship (Walker, 2019). Preparing future teachers to deal with the stresses of classroom management, accommodations of students, parent and administration expectations may be part of the problem that relates directly to recruitment of individuals interested in joining the teaching workforce.

Preparing future teachers for the diversity of students they will encounter is a challenge. Teaching is currently a predominately White, female profession and a gap exists between this demographic and the diverse student population (Ingersoll et al., 2014; U.S. Dept. of Ed. National Center for Education Statistics, 2015). For example, in the US, 26.2% of students are Latinx (US NCES, 2015) while only 9% of the teacher workforce are comprised of Latinx teachers (Will, 2018) creating an even more difficult issue when the students are not English proficient.

Resilience, Empathy and Self-efficacy in Teaching Profession

Learning to become a teacher is a complex process. It is one of the few professions in which beginners have the same responsibilities as experienced teachers on the first day of school. There are many known attributes in order for teachers to be successful, many of these attributes are related to social and emotional skills. There is a growing global need to focus on these non-cognitive variables that are critical for teacher success (Ledger, 2021).

Attributes such as resilience and empathy may have a relationship to how effective teachers can be effective educators with a diverse group of students. Dispositions such as empathy have been shown to assist future teachers in realizing their vision of culturally responsive pedagogy in their future classrooms (Warren, 2018). Empathic teachers have been shown to foster a stronger sense of belonging in their students, improve their relationships with teachers and peers, and boost their confidence in the overall school environment (Schutz & DeCuir, 2002). Scholars maintain that empathy can be categorized into different types, including emotional (empathic concern) and cognitive (perspective taking), with perspective taking being the key element in applying empathy in social interactions (Warren, 2018). Participation in field experiences in which teacher education candidates are in culturally diverse settings allow development of knowledge and reflection of their own beliefs, values, attitudes and skills (Warren, 2018). However, not all teacher education candidates have the opportunity to experience an environment that is culturally, ethnically or linguistically different from their own.

Resilience, which is connected to the development of teacher efficacy and supported by emotional competence, also seems to play a crucial role in the success of new teachers (Tait, 2008). Masten, Best, and Garmezy (1990) define resilience as ''the process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances'' (p. 425). Resilience is crucial not just for beginning teachers but for all educators, as it can improve teaching effectiveness, increase career satisfaction, and better equip teachers to adapt to the ever-changing conditions in education (Gu & Day, 2007; Howard & Johnson, 2004). Numerous studies have highlighted the importance of teacher resilience in improving job satisfaction, job performance, and the quality of instruction (Zhang & Luo, 2023) which leads to retention of teachers. In today's classrooms, teachers face numerous challenges, including students with diverse learning styles, varying academic abilities, and different

cultural backgrounds (Andriana Gaffar et al., 2019; Papatraianou & Le Cornu, 2014). Resilient teachers can navigate these challenges with a flexible mindset and a readiness to explore new approaches. Recognizing the importance of resilience for teachers, some educator preparation programs have implemented strategies within their program to develop resilience (Le Cornu, 2009).

Self-efficacy has been shown to have a relationship to empathy (Goroshit & Hen, 2016). Self-efficacy is based on Bandura's (1977, 1986) Social Development Theory, and is sometimes defined as the expression of beliefs of individuals related to their own capacity to perform a certain behavior (Gencturk et al., 2010). Self-efficacy is essentially an individual's level of confidence that he or she can accomplish a given goal. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses (Bandura, 1986) and the agency to persevere.

Researchers in the field of culturally responsive teaching practices have noted the importance of empathy to better understand students, parents and communities if teaching in a school that is ethnically and linguistically diverse (McAllister & Irvine, 2002). Scholars have argued that teachers who lack experience with diverse environments have a more difficult time translating culturally responsive pedagogy theory into practice (Warren & Talley, 2017). With a call for more research that explores the relationship between self-efficacy and other social emotional attributes (Goroshit & Hen, 2016), this paper explores the relationship between self-efficacy (related to culturally responsive teaching practices), empathy and resilience.

Career and Technical Education

Career and Technical Education (CTE), also known as vocational education, aims to prepare high school students for the workforce, but also increase educational attainment as US industries need college-trained workers (Ames, 2022). As labor market trends shift, so does the demand for programs that enhance students' competitive edge in both the job market and higher education. Schools with a higher percentage of students enrolled in high school CTE programs have better attendance and completion rates than those with lower enrollment (Plank et al., 2008). Accredited CTE programs have demonstrated increased motivation and learning for students (Castellano et al., 2003).

Many high schools in the US have career technical education courses that are focused on teacher education, hoping to encourage and prepare students to choose teaching as a profession with early experiences and courses. The listing of Texas high school courses focused on teacher education (TEA, 2022) is shown in Table 1. In Texas the Practicum in Education and Training involves field-based internships where students partner with exemplary educators to receive hands-on experience as they design and deliver their own lesson plans (TEA, 2017). In addition, there are "Grow your own" programs in high schools with the same focus of preparing teachers to replenish their local teacher openings. One challenge for these programs is placement in schools for the number of observation and interaction hours that are needed. These field experiences are a critical component in the development of future teachers.

Table 1. Secondary Courses for High School Credit in Texas

Level	Course Description
1	Principles of Education and Training & Principles of Human Service
2	Human Growth and Development, Child Development & Communication and Technology in Education
3	Instructional Practices & Teaching Strategies for Special Populations
4	Practicum in Education and Training, Project Based Research & Career Preparation I

Simulations for Classroom Observations and Practice Teaching

This paper reports on one strategy that was used to provide not only observation hours for these CTE students, but also the opportunity to make classroom decisions using a simulated teaching environment. The simulation also includes targeted feedback to improve teaching strategies and decisions. In addition, the simulation provides experiences with a diversity of students in gender, ethnicity, learning needs, and emotional needs. Badiee (2012) identified four advantages to simulation-based learning: (a) classroom decision-making, (b) practice through repeating, receiving feedback and advice, (c) self-efficacy in classroom teaching, and (d) collaborations and social interactions. Fischler (2006) added that simulation-based learning has great potential in education by allowing educators to act within virtual environments, immediately applying theory to realistic yet controlled settings. Digital simulations offer a virtual learning environment provide approximation of practice for real classroom contexts with various scenarios allowing students to practice, make mistakes, reflect, and improve on their practices (Ledger, 2021).

SimSchool is a dynamic, online classroom simulation program that allows the opportunity to practice teaching in a safe environment for experimenting and practicing strategies and techniques, especially methods of addressing different learning needs, and wide variations in academic and behavioral performance of students. Using student profiles, teachers need to be able to plan and deliver culturally responsive instructional challenges and supports that build on the strengths of students to address their learning needs (Sianjina, 2000). Teachers need to be able to assess students, analyze the results, and enable adjustments to their instruction to ensure that all students are learning and achieving higher results (Girod & Schalock, 2002).

Traditionally, teacher education programs include classroom practices in their curriculum and follow the assumption that knowledge is acquired by doing (Dewey, 1938), requires reflection (Schön, 1991) and is situated in context (Lave & Wenger, 1990). These assumptions are implemented in the programs in the form of the clinical teaching experiences which require a human to provide necessary feedback for improvement. The clinical teaching (student teaching) has long been embraced to provide future teachers with an opportunity to practice and reflect on teaching with the assumption the theories they have studied translate into practice (Zeichner, 2010). Traditionally the practicum experience has been situated in school-based contexts, but that is more difficult to do with high school students who are interested in becoming a teacher. In addition, field-based experiences may not include diversity of students that allow growth in culturally responsive teaching practices. Some researchers have suggested that technology-based simulated environments may supplement and support the teacher education

practicum experience (Sasaki et al. 2020). These technology-based experiences can also include a wide range of diversity in student culture, ethnicity and linguistics that may not be experienced otherwise. This study examines the use of a simulated teaching environment used with high school career technology education (CTE) teacher education participants to determine the impact on their culturally responsive teaching practices, empathy and resilience. The research questions for this study are:

1. To what extent do simulated teaching experiences impact the dispositions of high school students in a program focused on teacher education? Specific measures were:
   a. Culturally responsive teaching self-efficacy
   b. Empathy
   c. Resilience
2. What relationships exist between culturally responsive teaching self-efficacy, empathy and resilience?

Method

The Study

The study aimed at using a computer-based online simulated teaching environment to improve equitable teaching practices with the goal of improving instruction, as well as dispositions for participants in a career technology education high school program focused on teacher education. University ethics approval was obtained to recruit participants and collect data from both teachers and students. Participants were recruited from three classes in the CTE TE program. The components of the pilot project included a self-report pretest survey, completing the required modules of the simulated teaching program, and completing a self-report posttest survey. The participants completed the cycle of pre-post surveys and modules in approximately six weeks.

Intervention

SimSchool, a cloud-based, simulated teaching environment, uses learning analytics (LA) to capture user interactions in the simulated classroom environment and displays quantifiable teacher observation criteria benchmark data as well as visual data so participants can self-reflect on their performance, adapt their practices (Kovanovic et al., 2021) and complete multiple iterations of interactions with simStudents while adapting their teaching strategies. SimSchool's inference engine draws upon several instructional models and frameworks to simulate the authentic human behaviors and reactions that one experiences when teaching in simSchool (simSchool, 2018-19). These extensively researched and validated models include: 1) Cattell-Horn-Carroll Theory of Intelligence (Schneider & McGrew, 2012); 2) OCEAN model of Emotion (McCrae & Costa, 1996); 3) Interpersonal Circumplex Theory (Smith, 2013); 4) Standard models of language learning and language proficiency used to diagnose ELL students (Phakiti et al., 2013); and 5) Structural functional (Case, 1993) and social constructivist theories of learning (Dweck, 1999; Vygotsky, 1962). These models are distilled into "cognitive and behavioral states" within simulated students and "cognitive and behavioral requirements" within instructional tasks. When a student has a certain quantitative reasoning ability, for example, an assigned math task has a quantitative reasoning requirement already coded. How the student performs and behaves is a direct

reflection of how well-matched expectations are to students' capabilities.

Each participant first completed an instructional video module introducing simSchool and providing navigation tips. A second instructional video module focused on how to view, understand and use the feedback provided to the participants following each module. Participants were instructed by their teachers to complete at least five of the eight modules. Each of the content modules required completion of at least three sessions using feedback for iterative changes. Each session consisted of teaching the provided lesson for at least 15 minutes, reviewing provided feedback and reteaching the lesson with the goal of improvement based on the feedback. The average total amount of time spent actively completing simulations was 4 hours and 45 minutes. At the end of each simulation session, participants received graphical feedback displaying degree of success at promoting academic, emotional and equity performance in the simulated class overall, as well as feedback regarding the degree of suitability of the instructional activities selected for each individual simulated student in the class. Figures 2 and 3 illustrate examples of graphical feedback as well as an observation report that participants received.

Number	Name	Classes
simModule 1	Learning to Teach in simSchool	
simModule 2	Understanding Observation Reports in simSchool	
simModule 3	Classroom Management Grade 1	
simModule 4	PK Bunny Math	
simModule 5	K1 Synonym Spider	
simModule 6	PK All About Me - Encouraging Cultural Understanding	
simModule 7	(3-5) Bullying and Bias Crocodile and Ghost Bat Have a Hullabaloo (EQ)	
simModule 8	Classroom Management Grade 5	

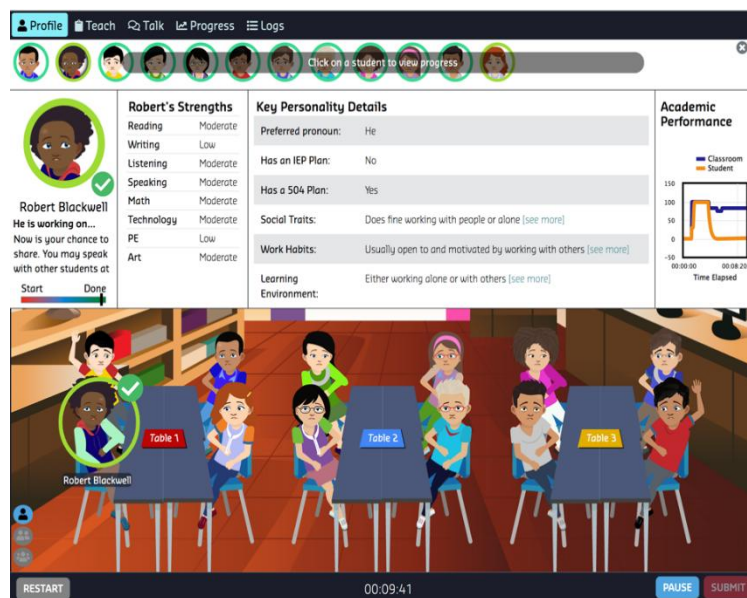Figure 1. Modules Provided to the High School Students in simSchool

Figure 2. SimSchool Classroom Highlighting Student Profiles

Figure 3. Benchmark Feedback After Teaching Session in simSchool

Participants

Initially, 34 students from the career technical education course focused on teacher education completed the pretest survey and began the program. However, the full program that included the posttest was only completed by 15 participants. Students were instructed to complete at least five of the eight modules provided. Each of the modules, after the first two instructional video modules, was completed three times with feedback after each session. In addition, students completed pre and posttest surveys that focused on culturally responsive teaching self-efficacy, empathy, resilience and dispositions related to technology. All participants were in their final year of high school in the state of Texas. The sample of 15 participants who completed the program included 11 females, three males and one declined to respond. The ethnicity of the participants included two Black/AA, four Hispanic, eight White and one who declined to respond.

Instrumentation

Participants completed pre and posttest surveys in addition to the data that were collected during the simulated teaching practices. The list of survey instruments is described in more detail.

1. The *Culturally Responsive Self-Efficacy Survey* (Siwatu, 2007) was included to determine the level of competency in the skills and knowledge needed to engage in culturally responsive teaching that includes curriculum, assessment, classroom management and cultural enrichment. While the original survey was longer, 25 items from the survey were used for this project data collection. Participants were asked to indicate their level of confidence in each of the items below by choosing a response between 1 and 6. These ratings range from 1 = Strongly Disagree to 6 = Strongly Agree.

2. The 28 empathy items were selected from two separate survey instruments. The first 22 items were selected from the first two factors from the *Empathy Quotient* survey developed by Baron-Cohen & Wheelwright (2004). The original 60 item survey included three factors which were labeled cognitive empathy, emotional reactivity and social skills (Lawrence et al., 2004). The first two factors from the

Empathy Quotient were selected for this study. Six items from the *Thinking and Feeling instrument* (Garton & Gringart, 2005) were also deemed appropriate for the current study. After completing reliabilities for this set of data, the scale was found to be more reliable without item 25, so it was removed from the Feeling and Thinking survey instrument items for analysis as a scale. Participants were asked to indicate their level of confidence in each of the items below by choosing a response between 1 and 6. These ratings range from 1 = Strongly Disagree to 6 = Strongly Agree.

3. The Resilience in Teaching-Related Situations (Bamberger et al.) is an 8-item Likert survey in which participants selected from 1 = very true of me, 2 = untrue of me, 3 = somewhat untrue of me, 4 = somewhat true of me, 5 = true of me, and 6 = very true of me.

4. A four item dispositions toward technology was created to determine the comfort level the participants have with technology. The participants selected one statement that best described their feelings toward technology from the following items:
    a. I avoid using technology as much as possible.
    b. I use technology a lot but it's just a tool for me, not a hobby.
    c. I enjoy working with technology and learning new ways to use it.
    d. I often help my friends with their technology problems, and I like showing them how to use technology in different ways.

5. Participant were asked to select their #1 use of technology in their free time from the following choices:
    a. Talking/emailing with friends or family members
    b. Playing games
    c. Listening and downloading music
    d. Getting information about places to go and things to do
    e. I only use technology for my schoolwork
    f. I don't have any access to the Internet outside of school

6. An additional item was included related to the importance of having access to technology to their education. The option for response included unimportant, somewhat unimportant, somewhat important, very important.

Reliabilities for each of the scales were calculated based on the initial set of pretest data which included responses from 34 participants. After examining the alpha with items deleted, it appeared that two of the scales were much stronger with one item removed from each. Therefore, the subsequent analysis was completed with the removed items. As shown in Table 2, estimated reliabilities ranged from .763 to .959 which is considered respectable to very good (DeVellis, 2012).

Table 2. Reliabilities for the Survey Scales

Measures	n	No items	Alpha	Items deleted	No items	Alpha
CRTSE	34	25	.969			
Cognitive Empathy	34	13	.928			
Emotional Reactivity	34	8	.617	Delete item 2	7	.785
Thinking/Feeling	34	6	.707	Delete item 25	5	.763
Resilience	34	8	.837			

Results

To determine changes using matched pairs, t-tests were completed for pre-post changes related to the simulated teaching intervention. In addition, comparisons were made for gender. However, there were no gender differences for this set of students. In addition, correlational analyses were completed to determine whether there were any relationships among these independent scales.

With only 15 matched pairs, only resilience was significant ($p < .05$) from pre to post (Table 3). However, effect sizes varied from Cohen's d = .27 to d = .57 across these five scales, indicating a positive change that was unlikely due to chance and small in magnitude according to guidelines by Cohen (1988) with average correlations of above .10, .30, and .50 indicating small, medium, and large effects, respectively.

Table 3. Pre-Post Changes Related to Simulated Teaching Experiences for High School CTE Participants

Measure		Mean	N	Std. Dev.	Sig	Cohen d
CRTSE	Pre	4.43	15	.49		
	Post	4.60	15	.72	.323	.265
Cognitive Empathy	Pre	4.19	14	.35		
	Post	4.58	14	.79	.095	.481
Emotional Reactivity	Pre	3.77	14	.48		
	Post	4.16	14	1.14	.216	.348
Thinking/Feeling	Pre	4.21	14	.35		
	Post	4.51	14	.76	.239	.330
Resilience	Pre	4.14	15	.49		
	Post	4.62	15	.74	.043	.574

Individual items that showed significant ($p < .05$) increases from pre to post are listed in Table 4 to indicate the types of changes that occurred during the intervention. All eight items from the Resilience scale were included in the table because it was the only measure that was significant overall, at the total scale score level. Significant ($p < .05$) increases from pre to post intervention related to culturally responsive teacher self-efficacy included helping students to develop positive relationships with their classmates and using student interests to make learning meaningful for them. Related to empathy, the two items that were significant at the $p < .05$ level were related to predicting how someone will feel and being able to tell if someone is interested in what they are saying. Five of the eight items related to resilience showed significant ($p < .05$) increases from pre to post intervention including being brave at taking on difficult challenges, thinking positively in negative situations, controlling negative emotions when encountering frustrations, and forgetting unhappy things quickly not dwelling on negative emotions.

There were no pre-post changes in the items related to the importance of technology to education and comfort level with technology. However, there were changes in frequency of the number one use of technology during free time from pre to post. As shown in Table 5, the largest frequency at pretest time was talking/emailing with

friends or family members (33.3%) but at posttest time, the use selected most frequently was listening and downloading music (53.3%).

Table 4. Individual Items with Significant Increases from Pre to Post Intervention of the Simulated Teaching Environment

Individual Items	Pre-Post	Mean	N	Std. Dev	Sig	Cohen d
CRSTE Items						
…help students to develop positive relationships with their classmates.	Pre	4.33	15	.724		
	Post	4.87	15	.743	.027	.640
…use the interests of students to make learning meaningful for them.	Pre	4.40	15	.632		
	Post	4.87	15	.743	.029	.628
Empathy Items						
6. I am good at predicting how someone will feel.	Pre	4.00	14	.392		
	Post	4.64	14	.842	.022	.692
12. I can easily tell if someone else is interested or bored with what I am saying.	Pre	4.00	14	.392		
	Post	4.57	14	.756	.014	.756
Resilience Items						
I can learn and grow from experiences that set me back.	Pre	4.53	15	.834		
	Post	4.73	15	.884		.158
Even if I suffer great challenges at school, I don't give up easily.	Pre	4.27	15	.884		
	Post	4.60	15	.737		.284
I am brave to take on difficult challenges at work and school.	Pre	4.00	15	.756		
	Post	4.60	15	.737	.045	.568
When encountering challenges, I keep active and try continually to solve the problems	Pre	4.20	15	.414		
	Post	4.60	15	.737	.054	.543
I can decrease my stress through exercises or leisure activities that I enjoy.	Pre	4.20	15	.561		
	Post	4.60	15	.737		.439
I try to think positively in negative situations.	Pre	4.20	15	.561		
	Post	4.73	15	.799	.015	.718
When encountering frustrations, I can appropriately control my negative emotions.	Pre	4.00	15	.655		
	Post	4.67	15	.816	.012	.741
I can forget about unhappy things quickly so that I don't dwell in negative emotions.	Pre	3.73	15	.799		
	Post	4.40	15	.986	.012	.741

The answer to research question 1 regarding the impact of dispositions on high school CTE students preparing to be teachers is yes, there was an impact due to the intervention. All five of the measures gained from pre to post and Resilience showed a significant (p <.05) gain while effect sizes indicated medium to large meaningful changes.

Table 5. Number one use of technology in free time

	Pretest		Posttest	
Use of Technology Selection	**N**	**%**	**N**	**%**
Talking/emailing with friends or family members	5	33.3%	3	20.0%
Playing games	4	26.7%	2	13.3%
Listening and downloading music	4	26.7%	8	53.3%
Getting information about places to go and things to do.	0		1	6.7%
I only use technology for my schoolwork.	2	13.3%	1	6.7%

Correlations

Pearson correlations were completed at both pretest and posttest time to determine if any relationships existed and whether they differed from pretest to posttest. There were many significant relationships among the variables. A relationship existed between Resilience and the three empathy measures (Cognitive Empathy, Thinking/Feeling Empathy, and Emotional Reactivity) which became much stronger at posttest time. For Resilience, just one of the three associations with the empathy variables (Cognitive Empathy) were significant ($p < .05$) at the time of the pretest (see Table 6), while after completing simulation teaching activities all three of the empathy variables were significantly ($p < .05$) related to Resilience (see Table 7).

Table 6. Correlations for Five Measures at Pretest

Measures at Pretest		**CRTSE**	**Cognitive Empathy**	**Emotional Reactivity**	**Think/ Feel**	**Resilience**
CRTSE	Pearson Correlation	1	.720**	-.393	.494	.563*
	Sig. (2-tailed)		.002	.147	.062	.029
	N	15	15	15	15	15
Cognitive Empathy	Pearson Correlation	.720**	1	.275	.402	.725**
	Sig. (2-tailed)	.002		.321	.137	.002
	N	15	15	15	15	15
Emotional Reactivity	Pearson Correlation	-.393	.275	1	-.117	.360
	Sig. (2-tailed)	.147	.321		.677	.188
	N	15	15	15	15	15
Think/Feel	Pearson Correlation	.494	.402	-.117	1	.332
	Sig. (2-tailed)	.062	.137	.677		.226
	N	15	15	15	15	15
Resilience	Pearson Correlation	.563*	.725**	.360	.332	1
	Sig. (2-tailed)	.029	.002	.188	.226	
	N	15	15	15	15	15

In a comparable alignment, for Culturally Responsive Teaching Self-Efficacy, just one of the three empathy variables was significantly ($p < .05$) associated at the time of the pretest (see Table 6), while all three of the

empathy variables were significantly associated at the time of the posttest (see Table 7). The posttest strength of association for Cognitive Empathy to Resilience ($r = .916$) and Culturally Responsive Teaching Self-Efficacy ($r = .961$), would be considered very large according to guidelines provided by Lenhard & Lenhard (2022). Regression analyses featured in the following section will examine the relative importance of the three empathy predictors of Resilience and Culturally Responsive Teaching Self-Efficacy at posttest time.

Table 7. Correlational Relationships for Five Measures at Posttest

Measures at Posttest		CRTSE	Cognitive Empathy	Emotional Reactivity	Think/ Feel	Resilience
CRTSE	Pearson Correlation	1	.961**	.672**	.886**	.857**
	Sig. (2-tailed)		.000	.009	.000	.000
	N	15	14	14	14	15
Cognitive Empathy	Pearson Correlation	.961**	1	.789**	.901**	.916**
	Sig. (2-tailed)	.000		.001	.000	.000
	N	14	14	14	14	14
Emotional Reactivity	Pearson Correlation	.672**	.789**	1	.652*	.776**
	Sig. (2-tailed)	.009	.001		.012	.001
	N	14	14	14	14	14
Think/Feel	Pearson Correlation	.886**	.901**	.652*	1	.806**
	Sig. (2-tailed)	.000	.000	.012		.001
	N	14	14	14	14	14
Resilience	Pearson Correlation	.857**	.916**	.776**	.806**	1
	Sig. (2-tailed)	.000	.000	.001	.001	
	N	15	14	14	14	15

Regression Analysis

Because of the relationships shown in the correlation analysis, linear regression analyses were completed based on posttest data for Resilience and Culturally Responsive Teaching Self-Efficacy using the three empathy measures as predictors. As shown in Table 8, the dependent variable was Resilience at posttest time with independent variables being Cognitive Empathy, Thinking/Feeling Empathy, and Emotional Reactivity. These variables together were able to account for 85% (RSQ = .848) of the variation in the Resilience measure. Only the Cognitive Empathy scale significantly ($p = .004$) predicted Resilience, in contrast with the two other empathy scales. The standardized coefficient beta was .873 for Cognitive Empathy. While there was a relationship at pretest time among these predictors and the dependent variable, the association was not as strong, with pretest RSQ = .56 (not shown) compared to posttest RSQ = .85.

Another strong relationship was between Culturally Responsive Teaching Self-Efficacy and the empathy measures. Results of the regression analysis with the dependent variable being CRTSE, and the independent variables being each of the three empathy measures are shown in Table 9. These variables together accounted for

94% (RSQ = .941) of the variation in the CRTSE measure. Once again, the Cognitive Empathy scale was the only significant predictor (p <.001). The standardized coefficient beta for Cognitive Empathy was 1.10. While there was a relationship at pretest time among these predictors and the dependent variable, the association was not as strong, with pretest RSQ = .90 (not shown) compared to posttest RSQ = .94.

Table 8. Regression Analysis Using Empathy Measures to Predict Resilience (Posttest)

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.688	.584		1.178	.266
	Thinking/Feeling Empathy	-.065	.293	-.065	-.224	.828
	Emotional Reactivity Empathy	.087	.138	.129	.627	.545
	Cognitive Empathy	.844	.348	.873	2.425	.036

a. Dependent Variable: Resilience

Table 9. Regression Analysis Using Empathy Measures to Predict Culturally Responsive Teaching Self-Efficacy (Posttest)

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.425	.344		1.237	.244
	Cognitive Empathy	1.023	.205	1.103	4.994	.001
	Emotional Reactivity Empathy	-.143	.081	-.223	-1.763	.108
	Thinking/Feeling Empathy	.036	.172	.037	.209	.838

a. Dependent Variable: Culturally Responsive Teaching Self-Efficacy

The answer to research question 2 regarding relationships between CRTSE, empathy measures and Resilience is that there are significant relationships which became stronger from pre to posttest administration of the surveys. At pretest, there were very few significant relationships between variables. However, by posttest time, each of the variables was significantly related to the others. In addition, using regression analysis, both Resilience and CRTSE were significantly predicted by Cognitive Empathy.

Discussion

While Resilience was the only measure as a total scale score that showed a significant (p <.05) increase from pre to post, effect sizes for the measures varied from Cohen's d = .27 to d = .57 across these five scales, indicating a positive change that was unlikely due to chance and small to moderate in magnitude according to guidelines by Cohen (1988). An interesting finding from this study is the emergence of a much stronger positive relationship between Resilience and the three empathy measures at posttest (RSQ = .94 post vs. RSQ = .56 pre), following the simulated teaching intervention. Findings regarding resilience align with results obtained through the simSchool

teaching environment more than a decade earlier (Christensen et al., 2011). Specifically, 2011 findings with preservice teachers showed significant (p <.001; ES = .96) positive gains, with increases greater than those reported over the same time frame by a comparison group (NS; ES = .40). The measure in 2011 was named instructional self-efficacy, which was reported to be a type of resilience against giving up as a teacher with the knowledge that another strategy might work when the first one or two did not (Christensen et al., 2011). Resilience is a crucial quality for sustaining a career in teaching (Tait, 2008). Grothberg (1997) has described resilience as the ability to overcome and even grow stronger from adverse experiences. Building teacher efficacy and resilience seems to play a vital role in the success of new teachers (Tait, 2008). A higher level of resilience might reduce the sizeable number of teachers who frequently face challenges during their first year and end up leaving the profession.

Cognitive Empathy was already a strong predictor of CRT (RSQ = .90) at the pretest but became stronger (RSQ = .94) by posttest time. Resilience became much more strongly associated with Cognitive Empathy over the course of the simulation exercises, from pre (RSQ = .56) to post (RSQ = .85). Cognitive Empathy appears to be the strongest predictor among the three empathy measures included in this study. This finding aligns with the findings of other researchers in the field who have noted that cognitive empathy is the type of empathy related to perspective taking which is focused on knowing (recognizing cultural differences) and doing something about it (changing pedagogy) (Warren, 2018). The findings from this paper support the previous studies that show the relationship of culturally responsive pedagogies is aligned with cognitive empathy as opposed to the other types of empathy measured in this study.

Resilience and self-efficacy have been linked as related concepts (Tschannen-Moran & Woolfolk Hoy, 2001). Resilience was shown to be highly related to all four other measures including culturally responsive teaching self-efficacy and three types of empathy in this study of high school students on the track to be teachers in the future. Scholars have determined that applying empathy is an iterative process that includes both knowledge and application of that knowledge to guide decision making (Warren, 2014). Implementing strategies like simulation experiences with targeted feedback could be a valuable tool in efforts to improve teacher practices with the ability to provide experiences with diverse students applying knowledge in an iterative process with quality reflective feedback.

Conclusion

Data gathered from 15 students enrolled in a career and technical education high school course focusing on teacher education were analyzed to determine whether using simulations in the high school career focused course of teacher education might be useful not only in increasing the number of observation hours students complete, but also using targeted feedback within a simulation that can improve confidence in teaching. An additional research focus was to explore the relationship between variables considered to be important for the success of teachers including resilience, empathy and culturally responsive teaching self-efficacy. Results from this pilot study indicated that providing simulation experiences for participants interested in a teaching career can significantly (p < .05) increase resilience and also have a positive impact on culturally responsive teaching self-efficacy as well

as empathy.

This study is not without limitations. One limitation is the small number of participants who completed the program. In addition, the participants were not randomly selected, but part of career technology education courses focused on teacher education.

Recommendations

Findings from this study are consistent with other findings in the literature, that there is a strong relationship among resilience, empathy and culturally responsive teaching self-efficacy. The use of teaching simulations is a valuable tool in the preparation of future teachers in providing not only interactive observations, but providing targeted feedback to iteratively improve pedagogical and management teaching practices. Other researchers have shown a similar increase in resilience through professional learning experiences (Mansfield & Beltman, 2019). This type of tool can also be used for inservice teacher professional development as an online, flexible program that can target many areas of teaching.

Notes

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